

## REMARKS

Favorable consideration of this application is respectfully requested.

Claims 2-8, 10-12, 14-17, 19-22, 24-26, 28-31, and 33-48 are currently active in this case. Claims 1, 2, 9, 13, 18, 23, 27, and 32 have been cancelled; Claims 3-5, 7, 8, 10-12, 14, 15, 17, 19, 20, 24-26, 28, 29, 31, 33, and 34 have been amended; and Claims 37-48 have been added. Each new and amended claim is supported by the specification and claims as originally submitted and no new matter has been added.

In the outstanding Official Action, the Drawings, Specification and Claim 33 were objected to; Claims 9-11, 13, 15-18, 21, 23-25, 27, 29-32, and 35 were rejected under 35 U.S.C. §102(e) over *Roychowdhury* (U.S. Patent No. 5,995,733); Claims 1, 7, 14, and 28 were rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Fabien* ("Indirect numerical solution of constrained optimal control problems with parameters", IEEE 1995); Claims 2 and 3 were rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Fabien* and further in view of *Srinivasan et al.* ("A multi-criteria approach to dynamic optimization", IEEE 995, hereinafter *Srinivasan*); Claims 4 and 5 were rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Fabien* and further in view of *Srinivasan* and *Yang et al.* ("A pseudospectral method for time-domain computation of electromagnetic scattering by bodies of revolution", IEEE 1999, hereinafter *Yang*); Claim 6 is rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Fabien* and further in view of *Srinivasan*, *Yang*, and *Pasic* ("An algorithm for numerical solution of differential-algebraic equations", IEEE 1997); Claim 8 is rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Fabien* and further in view of *Yang*; Claims 12 and 26 were rejected under 35 U.S.C. §103(a) over *Roychowdhury* in view of *Yang*; and Claims 22 and 36 were rejected under

35 U.S.C. §103(a) over *Roychowdhury* in view of *Phillips* (U.S. Patent No. 6,349,272).

Applicants appreciatively acknowledge the Examiner's identification of allowable subject matter in Claims 19, 20, 24, 33 and 34.

Applicants have corrected the specification as suggested by the Examiner in the outstanding Official action.

Applicants have amended objected Claim 33 as suggested by the Examiner in the outstanding Official action.

Applicants have amended Claims 19, 20, 33, and 34 to be in independent form including all the limitations of their corresponding base and any intervening claims. Therefore, based on the identification of allowable subject matter identified in the outstanding Office Action, Applicants respectfully submit that Claims 19, 20, 33, and 34 are now allowable.

Applicants have amended certain other claims to be dependent upon the above noted claims having allowable subject matter.

Applicants respectfully submit new claims 37-48, and respectfully ask for favorable consideration of the same. Applicants respectfully submit that the cited art fails to teach or suggest the Chebyshev Gauss-Lobatto collocation points discretized as claimed. Accordingly, Applicants respectfully submit that new Claim 37 is patentable over the cited references.

Applicants respectfully traverse the rejection of Claims 4 and 5 under the combination of (1) *Roychowdhury*, (2) *Fabien*, (3) *Srinivassan*, and (4) *Yang*. In particular, Claim 4 recites:

**4. A method of simulating a circuit, the method comprising:**

**defining a differential-algebraic equation of the circuit;**

**defining a simulation time interval corresponding to the differential-algebraic equation;**

**dividing the simulation time interval into time intervals, wherein the time intervals have corresponding polynomials for each time interval, wherein each polynomial is a portion of an approximation to a desired solution of the differential-algebraic equation; and**

**applying a collocation method to discretize the differential-algebraic equation;**

**wherein:**

**the simulation time interval has collocation points, and wherein the interpolating polynomial has a degree of M;**

**the approximation to the desired solution of the**

**differential-algebraic equations is** 
$$I_M u(t) = \sum_{k=0}^M \tilde{u}_k T_k(t),$$
 **wherein M is the highest degree of the interpolating polynomials.**

However, the combined references fail to suggest the same.

As a preliminary matter, Applicants respectfully note that the technology in the field of the invention relates to Ph.D. and beyond level simulation and applied mathematics is exceedingly complicated. The technology of the 4 cited art references is similarly complicated. It is worth noting that the inventors of the various art references and the present inventor are cited numerous times in various industry publications referenced by one or more of the art references themselves, attesting to the high degree of skill and knowledge in the field of

the various inventors and representing the leading edge of technology in this field of endeavor. In fact, it should be noted that the inventors of the cited references have extraordinary skill in the art, they are the best of the best on the leading edge of an extremely complicated field.

Absent specific instructions (e.g., a roadmap) on how to piece together many highly complicated references, the ordinarily skilled artisan would not be able to replicate Applicant's claimed invention. Even if the ordinary skilled artisan were somehow motivated to create Applicants' claimed invention, without further inventive input, s/he would not have the skills or tools to do so. In contrast, Applicants claimed invention is the roadmap needed to do exactly that.

Along these same lines, Applicants respectfully traverse the assertions in the outstanding Office Action that state, for example with regard to Claim 5, that the artisan "... *would have been motivated because that would allow the partial differential equation to be satisfied at the collocation points.*" However, every skilled artisan is motivated to solve differential equations at all points. And, nothing in *Roychowdhury*, *Fabian*, and *Srinivasan* (the *RFS* combination) truly suggests or points to the need for additional combination or reference. Moreover the problem solved by combining *Yang* with the *RFS* combination is a problem that only becomes apparent because of the *RFS* combination and then only when viewed in light of the claimed invention. Therefore, it is respectfully submitted that the *RFS* combination alone cannot suggest or motivate a practitioner to solve a problem that only occurs after the combination because that problem is not apparent until the combination is made. Therefore, Applicants respectfully submit that looking to *Yang* as an obvious addition to the *RFS* combination is more than what could be expected from the ordinarily skilled artisan.

Further, Applicants respectfully submit that while the technology in each of the references may be described such that one of ordinary skill in the art can make and/or use one or more of the inventions, the technology is not described in each in such a way that the ordinarily skilled artisan would be able to piece together four or five of these leading edge inventions to produce yet another new leading edge invention, or, more specifically, to teach construction of the present invention as claimed. If they were, certainly, that combination would have already been in practice within the industry at the time the present application was filed.

Therefore, Applicants respectfully submit that the rejections of Claims 4 and 5 over the combination of *Roychowdhury, Fabian, Srinivasan, and Yang* is an overly broad interpretation of the prior art and reasonable skills attributed to the ordinarily skilled artisan. Accordingly, Applicants respectfully submit that Claims 4 and 5 are patentable.

Applicants also respectfully traverse the rejection of Claim 6 under 35 USC 103(a) over the combination of *Roychowdhury, Fabian, Srinivasan, Yang, and Pasic*. Claim 6, in combination with Claim 5, recites:

**5. A method of simulating a circuit, the method comprising:**  
**defining a differential-algebraic equation of the circuit;**  
**defining a simulation time interval corresponding to the differential-algebraic equation;**  
**dividing the simulation time interval into time intervals, wherein the time intervals have corresponding polynomials for each time interval, wherein each polynomial is a portion of an approximation to a desired solution of the differential-algebraic equation; and**  
**applying a collocation method to discretize the differential-algebraic equation;**  
**wherein:**

the simulation time interval has collocation points,  
and wherein the interpolating polynomial has a degree of  
M;

the approximation to the desired solution of the

differential-algebraic equations is 
$$I_M u(t) = \sum_{k=0}^M \tilde{u}_k T_k(t),$$
 wherein  
M is the highest degree of the interpolating polynomials;  
and

a derivative of the approximation is

$$(I_M u)'(t) = \sum_{k=0}^M \tilde{u}'_k T_k(t).$$

**6. The method of Claim 5, wherein each  
coefficient  $\tilde{u}'_k$  is computed from  $\tilde{u}_k$ .**

However, the cited references fail suggest combination in a way that teaches the claimed invention.

As noted above, the *RFS* combination and *Yang*, absent a roadmap such as Applicants specification and claimed invention, fails to suggest the claimed invention. In part, such failure is because the references are highly technical solutions that would take either an extraordinary level of skill or a roadmap to piece together to meet Applicants claimed limitations. Further, the problem solved by the combination is only apparent once the combination is formed and when viewed in light of the claimed invention. In the case of Claim 6, each of these reasons is further magnified by the addition of the fifth reference by *Pasic*. Therefore, even if the cited references teach each claimed limitation, the cited references fail to put together or suggest that same combination, and it would be unreasonable to expect the ordinarily skilled artisan to do the same absent the roadmap provided by Applicants' disclosure and/or claims.

Accordingly, Applicants respectfully submit that it would be unfair to reject Applicants' claimed invention over the cited combination and Applicants

respectfully submit that Claim 6 is therefore patentable over the cited references.

Based on the patentability of independent Claims 4, 5, 19, 20, 33, 34, 37, and 44, Applicants respectfully submit that dependent Claims 3, 6-8, 10-12, 14-17, 21, 22, 24-26, 28-31, 35, 36, 38-43, and 45-48 are also patentable.

Consequently, no further issues are believed to be outstanding, and it is respectfully submitted that this case is in condition for allowance. An early and favorable action is respectfully requested.

Respectfully submitted,  
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